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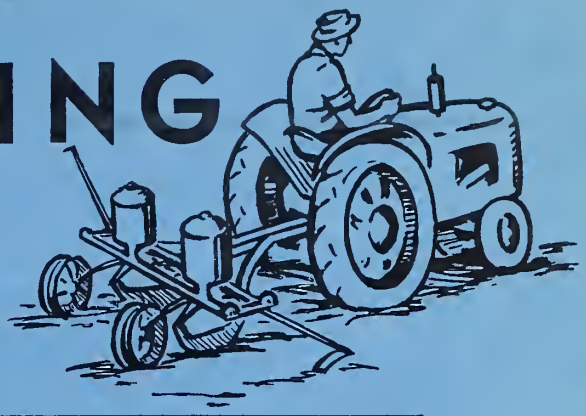
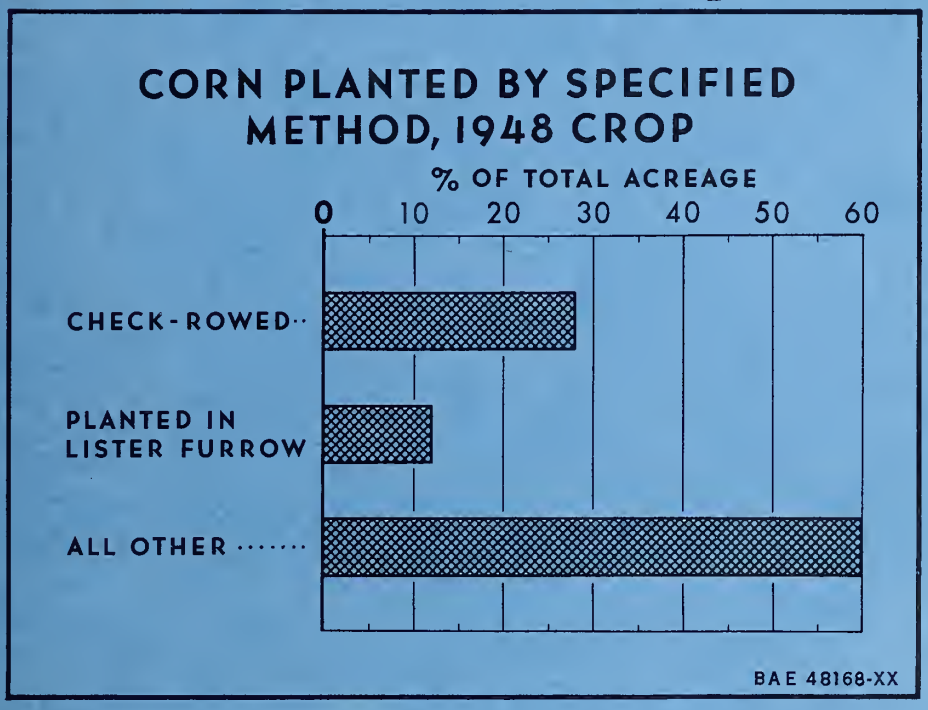
PLANTING AND FERTILIZING *Corn*





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SOURCE OF MATERIAL

The material of this report was obtained from the voluntary crop reporters of the United States Department of Agriculture in February 1949. A mailed questionnaire was used. More than 20,000 farms were covered in the study. Information was obtained regarding the acreage of field corn planted on individual farms in 1948, the distance between the corn rows, and the acres of corn that were check rowed, planted in lister furrows, and by all other methods. Reporters indicated the quantity of seed used for planting and for replanting their 1948 crop, the acres of corn that received one or more applications of commercial fertilizer, the total quantity of commercial fertilizer applied, and the amount of fertilizer applied before planting, at time of planting, and after planting. Reports concerning planting methods and fertilizing practices for corn were obtained on more than 17,000 farms. This report also carries estimates of the quantity of fertilizer used on corn in 1938. These estimates are based on information obtained from crop correspondents in February 1939. Together with the later figures they provide an indication of the increased use of commercial fertilizer on corn during the last decade.

PLANTING AND FERTILIZING CORN

By Albert P. Brodell, Agricultural Economist
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Corn is a major crop. In every year for more than a century more land has been used for corn than for any other crop. In most years corn accounts for one-fourth or more of the total harvested cropland and it ranks first in value.

Census reports show that in 1944 corn was harvested on 67 percent of all farms in this country. In earlier census years an even higher percentage of the farms reported that they harvested corn.

The importance of corn varies widely in different parts of the country. In 1939, according to census reports, corn was harvested on about 4,456,000 farms. Of these farms, about 40 percent harvested less than 10 acres, 29 percent harvested from 10 to 19 acres, 16 percent from 20 to 34 acres, 8 percent from 35 to 54 acres, and 5 percent harvested from 55 to 99 acres. Only 2 percent of the farms, in 1939, harvested 100 or more acres of corn but these farms probably accounted for around 14 percent of the total acreage harvested that year.

METHODS OF PLANTING

Estimates of the number of acres of corn in 1948 that was (1) check rowed, (2) planted in lister furrows, and (3) planted by all other methods, are given in table 1.

The survey on which these estimates are based indicated that, for the entire country, 28 percent of the acreage was check rowed, 12 percent was planted in lister furrows, and 60 percent was planted by all other methods combined. According to Farmers' Bulletin 199, "Corn Growing", more corn in 1904 was check rowed than was planted by any other method. When corn is check rowed, the distance between plants in the row is about the same as the distance between the corn rows. For check rowing, a wire chain is stretched across the field, and is used with planters of 2-row size and larger. With this device,

the hills in the row are planted uniform distances apart and about in squares. Small acreages of corn are sometimes check rowed by hand methods. Check-rowed corn can be cross-cultivated, and the control of weeds by cultivation is less of a problem than when other methods of surface planting are used. Check rowing is best adapted to large level fields.

Some corn is check rowed in practically all States, but this method accounts for more than half of the corn acreage in only three States - Minnesota, Iowa, and Illinois. A total of 19 percent or more of the acreage was check rowed, in each of the Corn Belt States and the Lake States, and in North and South Dakota. In the Plains States most of the check-rowed corn was in the eastern portions. Here the annual rainfall is higher than in the central and western areas. In most other States less than 5 percent of the acreage of 1948 was check rowed. Although definite information is not available it is believed that check rowing of corn is declining in most parts of the country. At one time, the method was used in fields that had varying degrees of slope. With increased attention to soil conservation practices, many of these fields are now contour farmed and are no longer cross cultivated.

About one-eighth of the corn acreage of 1948 was planted in lister furrows. With this method the corn is planted in deep furrows. The bottom of the furrow is usually 10 inches or more below the top of the ridge. The lister used in the western areas is essentially the same implement as the middle buster and middle breaker of the Southeast and other humid areas. Practically no corn is planted in lister furrows east of the Mississippi River or in the irrigated areas of the West. The practice is especially important in the Central and Southern Plains and in the eastern parts of the Mountain States. Most of the corn so planted is in level fields. This method of planting corn is well adapted to non-irrigated corn of the subhumid corn areas.

By planting in lister furrows, weed control is less of a problem than when other methods are used. It permits the development of a deep root system which enables the plant to withstand droughts and this means that fewer stalks are uprooted by winds. Planting corn in lister furrows is seldom done in the humid areas where heavy rainfall would cause a flooding of the furrows and so damage the young plants.

Corn planted by methods other than check rowing or planting in lister furrows accounted for about 60 percent of the total acreage in 1948. Such methods accounted for half of the corn acreage of the Corn Belt States and more than 90 percent of the acreage of the Northeast, the Appalachian States, the Southeast, the Delta, and the Pacific Coast States.

These include several rather different planting methods. Details are not available from the survey, but it is believed that most of such acreage is surface planted and planted by drill-type planters. With these planters, the plants usually are spaced individually in the row rather than grouped in hills as with check-rowed corn.

Some of the acreage planted by these methods is furrow planted but the furrows are not so deep as the lister furrows. Some corn planters are equipped with furrow openers. Planting by "all other" methods includes the acreage planted on beds or ridges.

DISTANCE BETWEEN ROWS

Distance between corn rows varies considerably, even between farms, of the same State. For the entire country more than 70 percent of the 1948 corn crop was planted in rows from 39 inches to 42 inches apart. Growers usually report "row widths" in an even number of inches, that is, 40 inches and 42 inches. Almost 40 percent of the corn was planted in row widths of about 40 inches. Planting distances in the Corn Belt and the Plains and Lake States are less variable than in other parts of the country. In the individual States of these groups from 82 to 95 percent of the corn was planted in row widths of 38 to 42 inches.

Little corn in the major producing States was planted in rows more than 48 inches apart. Closely spaced corn rows were reported in the New England States, in New York, and in most Mountain and Pacific Coast States. In New York and in the New England States, around 75 percent of the corn was planted in 36 inch rows or less. Only 12 percent of the total corn acreage in the United States was planted in these row widths. Only 2 percent of the total acreage was planted in rows more than 48 inches apart, and most of this was in the South. Much of the corn planted so widely apart is interplanted with such crops as peanuts, beans, and cowpeas.

RATE OF PLANTING

The quantity of seed used per acre for planting and replanting corn varies in different States and is influenced principally by the purpose for which the crop is planted, and by the width between the corn rows. The survey indicated that 7.5 pounds of seed were used per acre for the country as a whole. The data on rate of seeding are shown in table 2. The planting rate was highest in the Northeast, and in the Lake and the Pacific Coast States, and in some Mountain States. In most of these States, a relatively large percentage of the crop is planted for silage. In most States where seed used per acre is above average, the width between the corn rows is less than average. In most of the Southern States the seed planted per acre is below and the spacing between corn rows more than the United States average. In the Corn Belt the rate of planting and the distance between rows is about the same as the national average.

USE OF COMMERCIAL FERTILIZERS

Farmers have materially increased their use of commercial fertilizers during recent years. In 1938, the total quantity of all kinds of commercial fertilizer, including raw rock phosphate, basic slag, and agricultural gypsum, used on farms in the Continental United States was estimated at 7,472,000 tons. In 1948, a total of 17,228,000 tons or about 2 1/4 times as much as in 1938 was used.

Reports from crop correspondents indicate that an average of 38 pounds of commercial fertilizer was applied per planted acre of corn in 1938. In 1948, the application per acre average 102 pounds - nearly triple the 1938 figure. Commercial fertilizer used on corn in 1948 contained about 10 to 15 percent more plant food per ton than did the 1938 fertilizer.

From 1938 to 1948 increases in fertilizer used on corn are indicated for all States, with the largest percentage increases being found in the States west of the Mississippi River. However, only a small percentage of the acreage in most States west of the Mississippi was fertilized. Increases were also pronounced in the Northeast, the Southeast, and the Appalachian States. In 1948, a total of 90 percent or more of the corn in New England, Virginia, North Carolina, South Carolina, and Georgia, received one or more applications of fertilizer.

Of the total fertilizer used on corn, more than half was applied at planting time. About one-sixth of the total fertilizer was applied after the crop was planted. Application of fertilizer in most of the Southern States was much above the average for the country. In the South, many farmers apply nitrogen fertilizers to corn as a side dressing, after planting.

In most northern and western States practically all of the fertilizer was applied at or before planting time.

Table 1.- Method of planting corn and time of applying fertilizer, 1948, and quantity of commercial fertilizers applied to corn, 1938 and 1948, by States

State and area	Acreage planted in 1948	Percentage of 1948 crop: Planted Check rowed	Planted in lister furrows	Planted by all other methods	Average amount of fertilizer applied per acre planted: 1938	1948	Percentages of 1948 planted acreage that received one or more applications of fertilizer	Percentage of fertilizer applied in 1948: Before planting	At planting	After planting
	Thous.	Pct.	Pct.	Pct.	Lbs.	Lbs.	Pct.	Pct.	Pct.	Pct.
New England	160	3	-	97	227	400	90	30	69	1
New York	685	2	-	98	142	250	86	24	76	-
New Jersey	194	10	-	90	255	325	84	36	62	2
Pennsylvania	1,416	5	-	95	141	260	89	23	76	1
Delaware	142	5	-	95	139	250	86	35	65	-
Maryland	490	10	-	90	135	205	87	29	71	-
Northeast	3,087	5	-	95	152	260	88	26	73	1
Ohio	3,701	28	-	72	82	195	88	19	80	1
Indiana	4,756	19	-	81	57	155	91	12	88	-
Illinois	9,298	56	-	44	7	60	32	50	46	4
Iowa	11,213	65	7	28	6	40	28	37	54	9
Missouri	4,486	21	10	69	5	55	31	63	35	2
Corn Belt	33,454	46	4	50	22	81	45	31	67	2
Michigan	1,729	19	-	81	36	100	67	18	81	1
Wisconsin	2,570	38	-	62	38	135	81	28	72	-
Minnesota	5,198	70	1	29	4	45	39	30	66	4
Lake States	9,497	52	1	47	19	79	55	27	72	1
North Dakota	1,147	31	5	64	1/	8	7	20	80	-
South Dakota	3,728	46	25	29	1/	7	5	70	25	5
Nebraska	7,048	9	78	13	1/	7	6	15	15	70
Kansas	2,498	4	77	19	1	5	5	21	64	15
Great Plains	14,421	20	58	22	1	7	6	28	29	43

- Continued -

Table 1.- Method of planting corn and time of applying fertilizer, 1948, and quantity of commercial fertilizers applied to corn, 1938 and 1948, by States - Continued

State and area	Acreage planted in 1948	Percentage of 1948 crop: Planted Check-rowed	Planted in lister furrows	Planted by all other methods	Average amount of fertilizer applied per acre planted: 1938	1948	Percentages of 1948 planted acreage that received one or more applications of fertilizer	Percentage of fertilizer applied in 1948: Before planting	At planting	After planting
	Thous.	Pct.	Pct.	Pct.	Lbs.	Lbs.	Pct.	Pct.	Pct.	Pct.
West Virginia	297	10	-	90	120	190	74	32	62	6
Kentucky	2,445	6	-	94	54	140	75	23	74	3
Tennessee	2,266	2	-	98	40	140	64	24	68	8
Virginia	1,185	7	-	93	136	275	91	18	72	10
North Carolina	2,248	1	-	99	206	370	93	19	50	31
Appalachian	8,441	4	-	96	104	222	79	21	62	17
South Carolina	1,422	-	-	100	188	285	93	2	63	35
Georgia	3,205	-	-	100	84	265	91	8	63	29
Florida	712	1	-	99	87	145	64	24	62	14
Alabama	2,747	1	-	99	68	225	84	13	55	32
Southeast	8,086	1	-	99	97	244	87	9	61	30
Mississippi	2,250	1	-	99	36	155	65	33	31	36
Louisiana	955	1	-	99	58	115	73	37	29	34
Arkansas	1,305	3	2	95	13	70	37	29	46	25
Delta	4,510	2	1	97	34	122	59	33	33	34
Oklahoma	1,332	5	37	58	2	30	25	15	80	5
Texas	2,765	1	20	79	9	40	22	50	34	16
Okla.-Texas	4,097	2	26	72	7	37	23	41	46	13
Montana	205	12	13	75	2	6	4	60	23	17
Colorado	619	-	70	30	1/	10	8	55	26	19
New Mexico	150	2	60	38	1/	2	2	-	-	-
All other 2/	149	1	16	83	1/	9	5	55	35	10
Mountain	1,123	3	51	46	1/	7	6	57	29	14
Pacific	112	6	-	94	7	32	23	32	53	15
United States	86,828	28	12	60	38	103	48	28	57	15

1/ Less than 0.5 pounds. 2/ Includes Idaho, Wyoming, Arizona, Nevada, and Utah.

Rate of planting, distance between corn rows, and percentage of growers planting at

Table 2.- Corn: Rate of planting, distance between corn rows, and percentage of growers planting at specified row widths, by States, 1948

State and area	Acres planted	Seed planted per acre	Average distance between corn rows	Percentage of corn growers planting in row widths of - 1/							
				34 inches and less	35 and 36 inches	37 and 38 inches	39 and 40 inches	41 and 42 inches	43 to 48 inches	49 to 54 inches	55 inches and more
	Thous.	Lbs.	In.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
New England	160	15.5	36	13	64	5	7	11	-	-	-
New York	685	14.0	36	17	58	5	7	12	1	-	-
New Jersey	194	9.0	41	3	16	5	9	41	24	2	-
Pennsylvania	1,416	9.0	38	10	22	17	22	27	2	-	-
Delaware	142	8.0	42	7	6	18	30	31	8	-	-
Maryland	490	8.0	40	5	12	5	20	45	13	-	-
Northeast	3,087	10.2	38	11	29	11	17	27	5	-	-
Ohio	3,701	8.0	40	2	3	12	47	34	2	-	-
Indiana	4,756	7.0	40	1	4	13	52	28	2	-	-
Illinois	9,298	7.5	40	1	2	4	58	32	3	-	-
Iowa	11,213	8.0	40	1	1	2	68	27	1	-	-
Missouri	4,486	7.0	40	3	7	7	27	51	5	-	-
Corn Belt	33,454	7.6	40	1	3	6	55	33	2	-	-
Michigan	1,729	8.5	39	7	17	9	23	40	4	-	-
Wisconsin	2,570	9.0	40	5	13	11	31	37	3	-	-
Minnesota	5,198	8.0	41	2	5	7	45	39	2	-	-
Lake States	9,497	8.4	40	4	9	8	37	39	3	-	-
North Dakota	1,147	8.0	40	7	9	5	22	54	3	-	-
South Dakota	3,728	7.0	41	3	3	2	39	49	4	-	-
Nebraska	7,048	7.0	40	1	3	2	58	36	-	-	-
Kansas	2,498	6.5	40	3	3	3	37	50	4	-	-
Great Plains	14,421	7.0	40	2	4	2	47	43	2	-	-
West Virginia	297	8.5	39	6	31	8	19	30	6	-	-
Kentucky	2,445	7.0	40	4	17	7	20	44	8	-	-
Tennessee	2,266	7.5	41	3	13	4	18	48	13	1	-
Virginia	1,135	8.0	41	4	17	2	18	45	13	1	-
North Carolina	2,248	7.5	44	2	11	3	11	32	35	3	4
Appalachian	8,441	7.5	41	3	15	4	17	42	17	1	1

- Continued -

Table 2.- Corn: Rate of planting, distance between corn rows, and percentage of growers planting at specified row widths, by States, 1948 - Continued -

State and area	Acres planted	Seed planted per acre	Average distance between corn rows	Percentage of corn growers planting in row widths of - 1/ 34 inches and less	35 and 36 inches	37 and 38 inches	39 and 40 inches	41 and 42 inches	43 to 48 inches	49 to 54 inches	55 inches and more
	Thous.	Lbs.	In.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
South Carolina	1,422	6.0	49	1	6	1	8	14	34	14	22
Georgia	3,205	6.0	46	3	9	2	13	21	33	7	12
Florida	712	5.5	48	5	14	4	7	12	37	6	15
Alabama	2,747	7.0	44	3	10	5	13	30	28	6	5
Southeast	8,086	6.3	46	3	9	3	12	22	32	8	11
Mississippi	2,250	7.5	40	5	28	7	22	27	9	1	1
Louisiana	955	8.5	45	4	14	3	17	26	18	4	14
Arkansas	1,305	7.5	42	2	20	10	21	26	14	1	6
Delta	4,510	7.7	42	4	23	7	21	26	12	2	5
Oklahoma	1,332	7.0	40	5	14	16	31	32	2	-	-
Texas	2,765	7.0	39	4	33	21	24	10	4	1	3
Okla.-Texas	4,097	7.0	39	4	27	20	26	17	3	1	2
Montana	205	8.0	39	7	23	2	15	51	2	-	-
Idaho	28	10.0	36	28	53	9	2	6	2	-	-
Wyoming	58	7.5	39	19	25	6	6	38	6	-	-
Colorado	619	7.0	37	20	26	13	27	11	3	-	-
New Mexico	150	7.5	38	7	26	21	30	14	2	-	-
Arizona	36	10.0	38	18	30	16	14	13	9	-	-
Utah	24	12.0	34	56	30	2	6	3	3	-	-
Nevada	3	11.0	33	50	50	-	-	-	-	-	-
Mountain	1,123	7.6	37	17	26	11	23	20	3	-	-
Washington	16	12.0	36	18	47	10	12	11	2	-	-
Oregon	31	9.5	39	11	23	1	20	45	-	-	-
California	65	9.5	36	29	46	8	9	6	2	-	-
Pacific	112	9.8	37	22	40	6	12	18	2	-	-
United States	86,328	7.5	41	3	9	6	39	34	7	1	1

1/ State group averages and United States averages are State estimates weighted by the planted acreage in 1948.